

LBNL Materials Sciences Division

EH&S Self-Assessment Report

Evaluation Year 2006

Performance Period: 7/1/05 - 6/30/06

MSD Division Director:

A. P. Alvisatos

Date:

Division Safety Coordinator:

R. J. Kelly

Date:

Index

Section	Title	Page
I	General Summary	3
II	Performance Summary	5
III	Review of Expectations/Validation Metrics	6

Appendices (Numbered by Expectation)

1	Safety Committee Agenda, May 10 2006
	Safety Committee Agenda, November 7, 2005
	Materials Safety Editions (4)
	Lessons Learned from MSD Activities (3)
2	Reserved
3	Summary of all CATS Findings for Year
	Summary of Inspection Findings from UCB
4	Reserved
5	Reserved
6	MSD Activity Hazard Document List
7	Record of Ergonomic Evaluations
	Individuals Who Have Not Completed EHS060
8	Chemical Inventory Update Record
	Chemical Inventory Implementation Audits
9	OSHA Deficiency List
10	Key Findings from Laser Safety Inspections
	Laser Safety Management Review Report
11	Reserved
12	Reserved
13	SAA Inspection Records (5)
	Waste QA Performance List
14	MSD Personnel Who Have Not Completed JHQ
	MSD Personnel Who Have Completed JHQ
	Incomplete Training for MSD Personnel
	Completed Training for MSD Personnel
15	TMF010 “Integrating Safety Into Science at the Molecular Foundry”
	MSD010 “Introduction to EH&S for MSD Laboratory Personnel”
16	Reserved
17	Reserved
18	Reserved

I. General Summary

The Materials Sciences Division (MSD) conducts basic research in areas of materials sciences consistent with the mission of the Department of Energy (DOE). MSD is dedicated to discovering, creating and developing the new materials and phenomena that advance society's understanding of nature, benefit other scientists in their research efforts, and provide the basis for technology development in other institutions, including U.S. industry.

The Materials Sciences Division (MSD) is committed to performing cutting edge research while ensuring the highest level of safety for staff, students and visitors at both the Lawrence Berkeley National Laboratory (LBNL) and at the University of California at Berkeley. MSD continues to expand its personnel and space and now includes 67 “principal investigators” and other scientific staff members in 6 buildings at LBNL and in 8 buildings in the Chemistry and Physics complexes on the University of California campus.

The Materials Sciences Division experienced a very exciting year in which construction was completed and scientific operations initiated in the Molecular Foundry. A Facility and EH&S Manager was hired in August 2005 to integrate and strengthen the safety program and an EH&S Technician position was created and has been filled in an acting role. A new building manager is being recruited to replace a retiree. The new appointee will have special skills to enhance the Divisions management of safety during movement of laboratories and equipment and renovation activities.

The Division experienced no lost time injuries during the assessment year. Two students suffered minor cuts that were OSHA recordable. Notably, there were no recordable ergonomic injuries during the year, a significant improvement from the prior year.

The Division did experience three small fires during the year, two in the Molecular Foundry and one in Latimer Hall on campus, all caused by defective equipment. Only the Latimer Hall fire resulted in any significant equipment loss, as the fire damaged a hood and equipment in the hood. Other incidents included a chemical spill in the Foundry when a defective shelf collapsed, a near miss involving scissors improperly disposed in the trash and rupture of a container of inappropriately mixed chemicals in building 72. Nobody was hurt in any of these incidents.

Communication with principal investigators, staff and students was enhanced during the assessment year. Four editions of the Division’s safety bulletin, “Materials Safety”, and two “Lessons Learned” were issued and a safety section has been added to the monthly Division newsletter. We developed an MSD-specific version of the institutional EH&S training class for supervisors and that is being presented via a peer-to-peer format; half of the Division PIs have completed this training. The safety committee has been revitalized and a subcommittee representing the Molecular Foundry has been established.

The Division was presented with a number of significant EH&S challenges during this assessment period. The transition to operational status in the Molecular Foundry, which involved the movement of numerous laboratories and installation of millions of dollars of scientific equipment, was completed without injury. However, a number of contractor-installed safety systems in the Molecular Foundry were found to be defective or improperly installed, requiring significant retrofit efforts.

We also found that laser safety controls were not being uniformly implemented in some of our labs. We discovered an abandoned refrigerator filled with old, potentially shock sensitive chemicals. Audits revealed that implementation of the chemical tracking, electrical safety and peroxidizable chemical management programs did not meet our standards. Management of the Divisions Activity Hazard Documents (AHD) has not been fully effective. Over 200 EH&S deficiencies were identified during the inspection of all MSD labs at LBNL and on campus, a number which is in line with expectations from prior years.

We approached these problems systematically and carefully, and have corrected or are in the process of correcting each of them. Engineered laser safety controls have been tested and where necessary have been repaired. Hundreds of containers of old, unneeded chemicals have been disposed. The chemical inventory has been greatly improved and all peroxidizable chemicals have been tested and appropriately labeled. Repair of the defective Foundry safety systems are proceeding. All of the Activity Hazard Documents will be reviewed and transferred to the web-based system by the end of the calendar year. After some delay, almost all of the deficiencies tracked in the Corrective Action Tracking System (CATS) have been resolved.

Several additional issues have been identified for the coming year. As in prior years, some Division laboratories continue to struggle with the details of the management of hazardous waste. Approximately half of the Divisions staff and students perform their research on the UC Berkeley campus and do little or no work in LBNL Facilities. This LBNL work performed at the UC Berkeley campus must conform to the "Partnership Agreement Between UCB and LBNL Concerning Environment, Health and Safety Policy and Procedures" dated March 15, 2004, as provided in the LBNL Institutional ISM Plan. While the spirit of this agreement is strong, we have identified areas for improvement that will be pursued.

A summary of the assessment of Division EH&S performance against the specified expectations and validation metrics is provided in section II of this report. The complete report is provided in section III. Appendices, numbered to correspond to the expectations, contain supporting information and records.

II. Performance Summary

The Office of Assurance and Assessment (OAA) has provided to the LBNL divisions a list of 22 “Performance Expectations” based on the Laboratory’s Integrated Safety Management Plan. The Division has reviewed its performance against these criteria and “color coded” each as satisfactory, partial, or marginal performance by a “green,” “yellow,” or “red” score, respectively. MSD performance against these criteria is detailed in Section III of this report. Our evaluation indicates that MSD merits 16 “green,” 5 “yellow,” and 1 “red” scores for this evaluation period. The results are summarized below. Last year the Division received 1 “red” and 2 “yellow” ratings.

Self Assessment Criteria Review Summary

#	Topic	Rating
1	Clear lines of communication within the Division for EH&S	Green
2	Environmental reviews as part of work planning	Green
3	Inspection of workspaces	Green
4	Review of work activities and inventory of hazards	Yellow
5	Maintenance and testing of engineering controls	Green
6	Implementation of administrative controls (Formal authorizations)	Yellow
7	Ergonomics	Yellow
8	Chemical inventory	Yellow
9	Correction of findings from OSHA inspections	Green
10	Laser safety	Green
11	Control of chemical, radiological and biological hazards during moves	Green
12	Peroxide forming chemicals are controlled	Green
13a	SAA management	Red
13b	Authorization compliance	Yellow
13c	Environmental violations	Green
13d	Waste QA samples	Green
13e	Notices of Non-compliance for waste	Green
14	Training	Green
15	Student Safety	Green
16	Tracking and management of EH&S Findings	Green
17	Completion of findings from prior self assessment, IFA, MESH	Green
18	Injury and near miss reporting and investigation	Green

III. Materials Sciences Division Review of Expectations and Validation Metrics

Expectation 1

Requirement

Line management regularly communicates ES&H policy, procedures, management safety expectations, and lessons learned to all staff. Division staff has clear lines of communication to convey ES&H issues, concerns, and suggested improvements to Lab and Division management.

Assessment

Communication within the Division on EH&S topics is conducted via several mechanisms:

Safety Committees

Each MSD research group on the LBNL main site has a group safety representative. This person serves as a point of contact for EH&S issues within his or her group. The MSD Safety Committee is composed of:

- The research group safety representatives
- The MSD EH&S Manager
- The MSD EH&S Technician
- The MSD EH&S Administrator
- The Building Managers of Bldgs. 62, 66, 67, 72, and 2
- The Hazardous Waste Specialist assigned to MSD
- The EHS Liaison to MSD

The role of the Committee is to advise Division management on the efficacy of existing EH&S policies, to help the Division develop new policies and implement existing policies, and to facilitate communication from EHS Division and MSD division management to the researchers. Minutes are e-mailed to all members of the committee and to all MSD PIs to ensure wide dissemination, as well as being placed on the MSD internal web site. This body met twice during the evaluation period. Also, the subcommittee composed of representatives of the Molecular Foundry was chartered and met once during the month of June.

Materials Safety

“Materials Safety” is the name of the Division safety news letter that is issued on an *ad hoc* basis. A total of 4 editions were issued during this evaluation year on the following topics:

- Introduction of the new Facility and EH&S Manager
- Cryogen Safety
- Proper handling of sharps waste
- Chemical Inventory and Management process

Editions of “Materials Safety” are sent to all MSD personnel electronically. In an effort to make the Director more visible in safety matters, a prologue by the Director has been added to the last two editions. This practice will be continued for future edition

Meetings with Research Groups

A number of *ad hoc* meetings were held between the EH&S Manager and LBNL-based research groups. This is a valuable mechanism for communication that will be expanded in the coming year.

Lesson Learned

MSD developed or help develop 3 lessons related to incidents in Division laboratories.

All of these resulting from defective equipment:

- Fire in the Foundry resulting from faulty temporary wiring
- Fire in Latimer Hall resulting from a faulty hot plate
- Chemical spill and splash due to faulty flammable storage lockers in the Molecular Foundry

Peer-To-Peer Supervisor Training

MSD extensively modified the institutional EH&S Training class for supervisors and principal investigators to reflect Division priorities and needs. The class was presented by MSD principal investigators to foster greater involvement and acceptance by investigators. The need to discuss safety issues within each research group was stressed in this training. This class was offered three times during June 2006. It will be offered at least 3 more times by September 30 and is required of all research supervisors.

Safety Discussions at Research Groups Meetings

During the year it became apparent that a number of the principal investigators did not routinely discuss safety topics at their meetings with their staff and students. This was addressed by stressing this as a critically important element in the EH&S For Principal Investigators and Supervisors class and through the meetings of the Division Safety Committee.

Feedback obtained late in the assessment year indicates that all research groups are now discussing safety topics as part of their routine meetings. Documentation of these meetings will be standardized this coming year within the Division, and each research group has been asked to establish a laboratory safety binder or notebook to document EH&S related issues, including group safety discussions.

Division ISM Plan

The Division ISM dates from 2001. While a few of the details are outdated, all of the core tenants of the current LBNL ISM plan are stated clearly and are still applicable. The critical role of the principal investigator is firmly established, and feedback gathered during training suggests that all Division PIs understand this responsibility. The ISM plan will be updated in the current year.

“Rating” for this Expectation

Based on the validation criteria for this expectation, the Division would merit a “green” for this expectation

Planned Corrective Actions

Update the MSD ISM Plan.

Expectation 2

Requirement

Work planning for new and existing work includes environmental reviews. Review includes waste reduction, emission reduction, and/or resource conservation.

Assessment

Environmental protection and waste minimization are a routine part of the EH&S assessment process for new work in the Materials Sciences Division. In addition, the Division took several steps to divert materials from the landfill by recycling. Examples are provided below.

- During fit up of the Molecular Foundry, large quantities of wood and cardboard waste were generated during uncrating and unpackaging of technical equipment. To minimize the delivery of recyclable resources to the landfill, separate cardboard and wood dumpsters were located at the Foundry loading dock for the duration of the fit-up process. Numerous loads of wood and cardboard have been diverted from the landfill.
- Several drums of unused metal chunks, flakes and powders were identified in a storage trailer. The owner had long since left LBNL. It has been possible to find users for some of these materials to divert them from the hazardous waste stream, although some of the materials remain and will have to be disposed of as waste.
- The EH&S Managers for the five DOE Nano Scale Research Centers have agreed to a policy that requires the filtration or scrubbing of all dispersible nanoparticles from effluent air before release to the environment. This policy is being applied in the Foundry and to other MSD nanoscale work.
- An acid/base neutralization system has been procured for the nanofabrication facility in the Molecular Foundry. By neutralizing wastewaters, hundreds of gallons of hazardous waste will be eliminated and flushed harmlessly down the sanitary drain. This system should be operational by the end of the summer, 2006.

- Howard Hansen from EH&S conducted a review of a new metal polishing operation in building 62. It had been believed that the aqueous effluent from this operation, with certain metal particles, would have to be collected as hazardous waste. It was determined that this was unnecessary and that the effluent could be safely directed to the sanitary sewer. This review diverted several gallons of effluent from the hazardous waste stream monthly.

“Rating” for this Expectation

A rating of “green” is appropriate for this expectation.

Expectation 3

Requirement

Workspaces are inspected/observed and evaluated on a regular basis.

Assessment

Workplace inspections in MSD fall into three general categories:

- Formal inspections mandated by LBNL policy or the Director
- Informal inspections by the MSD EH&S Manager and MSD EH&S Technician
- Inspections of labs by principal investigators and group safety leads.

Formal Inspections

MSD participates in the standard LBNL triumvirate of self-assessment evaluations, the “Management Evaluation of Safety and Health” (MESH) review, the “Integrated Functional Appraisal” (IFA) review and the “Self Assessment” (SA) review. Of these three reviews, the SA and IFA have workplace inspection components.

The SA is completed every year; the most recent MESH review and IFA were from the 2003 evaluation year. MSD runs the SA process, EH&S manages the IFA and the Office of Contract Assurance (OCA) manages the MESH review.

MSD is scheduled to participate in all three standard review processes in FY '06. The SA has been completed and is documented in this report. This is just starting and is scheduled to be complete by late in the summer. The MESH review has been delayed until September by agreement between MSD and the OCA.

In January and February, at the direction of LBNL Director Steven Chu, the MSD EH&S Manager and MSD EH&S Technician, with help from the LBNL and campus EH&S liaisons, inspected every MSD research space at LBNL¹ and every LBNL funded MSD lab on the University of California at Berkeley campus. In each case, the principal

¹ With the exception of MSD work at ALS, which was inspected by ALS personnel.

investigator participated in these inspections. This effort resulted in over 300 identified problems at LBNL and on campus, including a number of “medium priority”, potentially serious items. These inspections served as the inspection component of the annual self-assessment.

All EH&S issues that could not be immediately remedied were placed into the LBNL Corrective Action Tracking System (CATS) database, including findings from campus labs. It was later determined that it was not appropriate to track EH&S problems from campus in the CATS system and uncorrected items were removed and are tracked separately. Corrected EH&S issues on campus were not removed from the database.

The types of EH&S problems identified in LBNL-based MSD labs tended to differ from the type of problem identified in campus MSD labs. Generally, campus problems tended to be systematic, resulting from incomplete implementation of major EH&S program elements such as the respiratory protection, confined space and crane safety programs. Problems identified at LBNL tended to be more sporadic and variable. The failure to provide an emergency eyewash/shower in labs where people handle corrosive chemicals was identified in a number of labs both at LBNL and on campus, suggesting a systematic weakness in both programs.

By agreement, the UCB Office of Environment, Health and Safety on campus will track the completion of campus deficiencies. The MSD EH&S Manager has worked with campus representatives to evaluate and resolve the highest priority campus findings.

Informal Inspections

The MSD EH&S manager, MSD EH&S technician, the EH&S liaison to MSD, the laser safety officer and several other subject matter experts from EH&S conducted a range of inspections in MSD facilities. Examples include:

- A comprehensive inspection of electrical safety in labs in building by an electrical safety consultant and the MSD EH&S Manager.
- Several inspections of class 3b and 4 laser operations in LBNL labs by the Laser Safety Officer, Laser Safety Program Manager and the MSD EH&S Manager.
- Inspection of chemical tracking by the EH&S Technician
- Inspection of the peroxidizable chemicals testing and labeling by the EH&S Manager and EH&S technician.
- Inspection of toxic/flammable gas storage by the EH&S Manager
- Inspection of asbestos abatement work in building 62 by EH&S and the MSD EH&S Manager
- Quarterly inspection of the satellite waste accumulation areas by the EH&S Waste liaison and MSD EH&S Technician.

The EH&S Technician is beginning the implementation of a “Technician Action Plan” that will require him to inspect every Division lab at LBNL several times every year.

Inspection of Labs by Principal Investigators and Safety Leads

During the year, increasing emphasis has been placed on laboratory inspections performed by individual principal investigators and their assigned “safety leads” (where applicable). This responsibility was stressed as part of the training for supervisors, principal investigators and mentors. Investigators have been instructed to document their inspections and report items that cannot be immediately remedied to the EH&S Manager for inclusion in the CATS system.

MSD policy requires PIs to complete inspections at least annually. As all PIs participated in the lab inspections in January and February, they all achieved this criterion. Most PIs report that they are inspecting their laboratories at least quarterly.

No MSD principal investigators have participated in the institutional pilot training to improve the quality of walk around safety inspections. To date, no safety items have been reported by PIs or their safety leads for inclusion into the CATS system. This may represent ineffective inspections or simply a reluctance to have problems tracked in CATS. Thus, the effectiveness of the self-assessment by principal investigators in MSD is not completely clear. PI performance in this regard will be assessed during the 2006-7 assessment year.

“Rating” for this Expectation

A rating of “green” is appropriate, as all PIs participated with the EH&S Manager in comprehensive inspections during January and February 2006.

Planned Corrective Actions

Numerous and significant laser safety problems were identified during the laser safety assessments. Similarly, many electrical safety problems were identified in building 66 by the electrical safety consultant. Many of these issues were longstanding but had not been detected in prior self-assessments and integrated functional appraisals. This reveals weak technical elements in these formal assessment processes.

- The EH&S Division is in the process of making corrective actions to the laser and electrical safety inspection programs and revising the integrated functional appraisal process.
- The weaknesses in the prior Division self-assessments has been addressed by the hiring of the MSD EH&S Manager and the MSD EH&S Technician.
- The performance of the PI’s with regard to safety inspections will be assessed during the 2006-7 assessment year.
- Additional staffing will make it possible to maintain closer track of the status of corrective actions in CATS, thereby reducing the number of overdue items.

Expectation 4

Requirement

Divisions review work activities to identify, analyze, and categorize hazards and environmental impacts for the associated work.

Assessment

Many of the laboratory operations have been evaluated to determine if the existing or new proposed EH&S controls are adequate to ensure safety and protection of the environment. This type of in-lab review will be a part of the annual reauthorization of activity hazard documents.

All work proposed for the Molecular Foundry is subject to review and approval by the EH&S Manager. Each potential user of the Foundry must describe the type of work to be conducted and the types of samples, materials and equipment to be brought into the Foundry. The EH&S Manager reviews the proposal with help from subject matter experts from EH&S when needed, and determines the necessary controls for work in the Foundry.

However, this program has not yet been fully implemented in many respects. Many of the formal review documents have not been through this revised reauthorization process yet. There is no systematic method in place to capture or review “line management authorized” work, that is, work that is not subject to formal review and authorization. A system to do this has been proposed for the Molecular Foundry, but has not yet been put in place. The review of Foundry proposals is proceeding under an interim process pending the completion of a computer-based data collection, review and authorization process. Several radiofrequency exposure assessments requested from EH&S have been delayed due to a lack of appropriate testing equipment and resource limitations.

At this point, the Division relies on the HEAR database to inventory hazards in laboratories. The database was last updated in June 2005, but a cursory examination of the record indicates that the update was incomplete and not always accurate. Data for the Foundry has not yet been entered, due to resource limitations.

“Rating” for this Expectation

Based on the validation criteria, the Division would merit a “yellow” rating for this assessment year.

Planned Corrective Actions

- A review of the HEAR database will be conducted during the 2006-2007 assessment year. The intent of the review will be to determine if the HEAR database (as it currently exists or in a new planned iteration) is an optimal tool for the tracking of research hazards or if alternative mechanisms would better serve the Division. The preferred tool will be implemented within the Division.

- A systematic process for performing work process reviews for laboratories without formal authorization documents will be developed and piloted in several division labs.
-

Expectation 5

Requirement

Divisions ensure engineering and other safety/environmental controls are in place and maintained.

Assessment

Engineering controls present in the Division and under MSD control include the following:

- Fume hoods
- Glove boxes
- Emergency showers/eyewashes
- Machine guards
- Gas monitors
- Interlocks (laser, x-ray, accelerator)
- Ergonomic workstation modifications
- X-ray leak monitors
- Cranes and hoists

Each of these mechanical safety systems was inspected at some time during the assessment year.

- Hoods are tested and certified biannually by EH&S; all MSD hoods and HEPA filtered vacuums have been tested and are currently operational. Hoods and glove boxes were also examined as part of the self-assessment inspections.
- Eyewashes and showers are tested by Facilities. During the self-assessment, the tag on these systems was inspected to verify that they had been tested. No defective or untested systems were identified, but several labs were identified that lacked a necessary eyewash/shower. Appropriate systems have been installed in all but one of these labs. An edition of “Materials Safety” will directly address the need for eyewash and shower units and the use of these units.
- Machine guards were inspected in the machine shops during the self-assessment; one minor problem was noted in the building 2 shop and corrected promptly.
- Many of the laser interlock systems were not being maintained, were bypassed or otherwise not fully functional. The interlock system for the Van De Graff accelerator in building 62 had not been tested within an indeterminate time, and part of the alarm system was non-functional. These problems have been corrected and the testing of the interlocks has been written into the activity hazard document for the accelerator.

- Several Division labs use hydrogen leak sensors that are not being maintained or tested. Compensatory measures have been implemented, as the maintenance instructions and replacements for these sensors are not available.
- No problems have been identified with engineered ergonomic workstations.
- A preliminary review determined that potential problems with the three x-ray leak detectors associated with the building 62 x-ray diffractometers are in fact not problems.

Four cases were identified in building 66 where one of the fume hood sash support cables had broken and the sash was being supported by a single wire. Failure of this last wire could cause a severe injury or damage to equipment. The failure of so many of these wires nearly concurrently suggested that these wires had reached the end of their reliable lifecycle, so all of the hoods sash wires in the building were inspected. No additional failures were noted, but this will be inspected annually during the self-assessment process.

Information pertaining to the use of engineered controls is included in new MSD training:

- MSD/EHS026/24–EH&S for Supervisors and Principal Investigators
- MSD010–The new version of MSD 10 (Introduction to Safety in the Materials Science Division Laboratories) for new staff and students in MSD
- TMF 10– (Integrating Safety into Science at the Molecular Foundry)

“Rating” for this Expectation

A rating of “green” is appropriate for this expectation.

Expectation 6

Requirement

Divisions ensure administrative controls are in place and maintained.

Assessment

MSD maintains a range of formal authorization documents:

- Active Activity Hazard Documents: 32
- Biological Use Authorizations: 0
- Biological Use Registrations: 4
- X-Ray Authorizations: 4
- Sealed Source Authorizations: 1
- Radiological Work Authorizations: 2
- Low Activity Source Authorizations: 1

A range of problems was identified in the maintenance and implementation of the Activity Hazard Documents for MSD during the 2005-6 assessment year.

- AHDs had not been reauthorized in June 2005 as required—discovered and corrected in October, 2005 for most of the AHDs
- There is no record of the initial authorization of one AHD dating from July, 2005
- Operations covered by an AHD were transferred to a new lab, but the PI did not update the AHD. As a result, the AHD was not renewed within the 12 month period.
- Training for laser use was incomplete in some labs
- AHDs were not always being immediately updated when new students or staff arrived or work changed
- There is no centralized “official version” of the AHDs

No problems were identified with the other formal authorization documents.

“Rating” for this Expectation

Effort is underway to correct the identified problems in authorization documents. A rating of “yellow” is appropriate for this expectation pending these corrections.

Planned Corrective Actions

- Transition all AHDs to the on-line AHD system (target date: December 31)
- Review each operation for which there is a formal authorization document, including a physical inspection of the required controls

Expectation 7

Requirement

Divisions ensure that ergonomic hazards (computer, laboratory, and material handling) are adequately controlled and that employees are knowledgeable and engaged in this process including the early reporting of ergonomic pain or discomfort (before an injury): Ergonomic issues/concerns/discomfort/pain are reported promptly for immediate corrective action.

Assessment

Indicators of the status of the implementation of the ergonomics program are summarized below.

- MSD staff and students suffered no ergonomic injuries during the 2005-6 EH&S assessment year.
- Two ergonomic assessments were triggered by discomfort. One of these was cancelled when it was determined that the pain was not work related. The second, which is also classified as “unresolved”, dates from very late June, 2006, and the PI is seeking funds to make the necessary corrections. The assessment of the latter report of pain happened within 3 days of the report of the problem.

- Training: Several MSD employees had not completed the required ergonomics training, although about 40% of these individuals are recent hires, within the “grace period”. The total number of MSD personnel required to take this class is 67. Thus, the gross incompleteness rate is 25% and the 18% are actually “overdue”.

Ergonomics Class	# Required & Not Completed 6/30	# Required But In “Grade Period”	Net # “Overdue” Training
EHS060	17	4	13
EHS062	2		
EHS068	0		

- A total of 36 requests for ergonomic assessments were either recorded in the ERGO database or evaluated during the assessment year. The status of these as of the end of June is:

Cancelled:	9
Assigned (in process):	15
Completed:	11
1 unresolved:	1

Note: The ERGO database was found to be errantly reporting that assessments had been completed for many of the ergonomic assessment requests. This lead to lack of follow-up in some cases.

- Not completed within the required 30 day time frame: 7/36
- Not completed within the required 2 day time frame (pain reported): 1/1 (Note: The single work-related case involving a report of discomfort was reported on Wednesday, June 21 and assessed by EH&S on Monday, June 26, which is one day more than the criterion of 2 days for these types of cases.)

Almost all of the still pending (assigned) cases were originally assigned to John Seabury from EH&S, who reassigned them to Carmen Bates Ross on 7/3/06. Of the outstanding “assigned” cases:

- 3/15 are individuals who work only on campus
- 9/15 are individuals who recently moved into the Foundry and are requesting an evaluation for their new work station
- None involve reported discomfort

There was some confusion within the MSD ergonomics program this assessment year.

- Cases were being assigned to John Seabury from EH&S when they should have been assigned to MSD ergonomics assessment staff.
- The ERGO database was recording cases as having been investigated when in fact this was not the case. A review of the database lead to incorrect conclusions about the status of cases.

These problems did not result in any injuries, but did result in delays in completing ergonomic assessments.

“Rating” for this Expectation

A rating of “yellow” is appropriate for this expectation.

Planned Corrective Actions

Ergonomic assessments will be coordinated by the new MSD EH&S technician. He will conduct the bulk of these routine assessments for the Division, and will coordinate the recordkeeping within the ERGO database. Cases that are initiated due to discomfort will continue to be assessed by ergonomics experts from EH&S

Expectation 8

Requirement

Divisions maintain an accurate chemical inventory.

Assessment

Section 4.8.2 of Pub3000 requires each lab using chemicals to inventory their holdings and record them in the on-line “Chemical Management System (CMS)”. The CMS database serves a variety of purposes, including managing the fire loading in buildings, identifying peroxidizable chemicals and providing the information needed for an annual hazardous materials report to the City of Berkeley.

A preliminary assessment of the implementation of the chemical management system was performed in October 2005. Net implementation of the tracking requirement (both labeling the container and entering it into CMS) was measured:

Building	Net CMS Tracking (%)	Range (Among Labs) %
66	45	0-88
72	82	63-100
62	58	3-100
2	43	0-90

Note that this assessment did not include an evaluation of chemicals that were in the inventory that were in fact not present in the lab.

Midyear Corrective Actions

Due to the generally inadequate chemical inventory performance identified in the 10/05 review, a range of corrective actions were initiated:

- The MSD EH&S technician and EH&S Manager were trained in the use of the CMS system by the subject matter expert from EH&S.
- The EH&S technician met with many of the groups which demonstrated poor performance in the review to explain the importance and methods of the chemical inventory process. He also helped a large number of research groups update their inventory in the field.
- A “Materials Safety” newsletter was sent to the entire MSD community stressing the importance of the chemical database and offering administrative help in entering chemical records into the computer database.
- The implementation of the CMS system was re-evaluated during the January laboratory inspection initiative.
- At the urging of the EH&S subject matter expert, a new method to track chemicals was implemented in the Molecular Foundry. All chemicals on each floor are assigned to the program lead scientist, rather than spreading them out among the many staff scientists, post docs and students. This is expected to streamline the chemical inventory management process, minimize the problem created when transient students and post docs leave the Lab encourage productive sharing of reagents throughout the facility. If this works well, it will be expanded to the other MSD facilities.

Follow Up Assessment

Implementation of the CMS process was re-evaluated in June 2006 with the following findings:

Building	Net CMS Tracking (%)	Range (Among Labs, %)	Change (%)
66	55	0-100	+22
72	82	76-88	0
62	62	8-100	+7
2	52	0-90	+21

Building 67, the Molecular Foundry, was not included in this assessment, as the chemicals had been fully inventoried when moved to the building within the prior 2 months.

Discussion

Several months of effort to improve the use of the CMS in MSD resulted in significant improvements in all buildings except 72, which has consistently maintained a relatively high (82%) implementation. However, the internal goal of >80% accuracy for all buildings has only been met in B 72. Poor performing labs continue to have a great impact on the overall tracking (except in building 72).

The Office of Contract Assurance interprets the formal validation criterion for this expectation very narrowly. Credit is given to a chemical owner if at any time during the

assessment year their records in the CMS database are updated, regardless of how complete or accurate the update effort is. If 90% or more of chemical owners make any update effort, the rating of green is given. Between 80-90%, a “yellow” is given, below 80% a rating of “red” is awarded. As the quality of the update effort is not measured, it is possible to achieve a green rating and actually have a very inaccurate and incomplete inventory. This is a poor validation metric for this expectation, but MSD efforts to get this revised were unsuccessful.

47/53 (89%) of active MSD chemical owners made at least one update to their records in CMS this assessment year.

“Rating” for this Expectation

Based on the specified weak validation metric, MSD would warrant a “yellow” score for 2005-6.

Expectation 9

Requirement

Division-specific OSHA findings from the 2004 OSHA inspection are corrected in a timely manner.

Assessment

Correction of the OSHA findings was reported in the self assessment from last year, but three of these were found not to have been properly closed. All 84 of the identified OSHA corrective actions assigned to MSD were completed by March of 2006.

“Rating” for this Expectation

A rating of “green” is appropriate for this expectation.

Expectation 10

Requirement

Division laser safety program is effective in controlling exposure to laser hazards.

Assessment

Laser safety assessments in November and December 2005, prompted by a DOE laser inventory inspection, revealed widespread and serious laser safety problems within the Division. Problems were identified with interlock systems, signs, personal protective equipment, training, medical exams, work practices, inspections, support from EH&S and

housekeeping. As a result, laser work was suspended in several of the labs for a period ranging from hours to weeks until basic enhancements in safety systems could be effected.

The Deputy Division Director appointed a management review committee composed of the MSD EH&S Manager, the chair of the Laser Safety Committee (and a MSD PI), the deputy director of EH&S, the LBNL Laser Safety Program Manager and a manager from the Office of Contract Assurance. The committee interviewed PIs, post docs and students from Division laser labs and reviewed the results of laser inspections conducted in November and December. A formal report was submitted to Division management in April of 2006.

This laser safety report recommended a number of enhancements to promote safe use of class 3b and 4 lasers within the Division. These recommendations are currently being implemented.

In the transmittal letter for the laser report, MSD Director Paul Alivisatos committed to transitioning all MSD laser AHDs from a paper system to the Labs new on-line AHD review and authorization system by the end of July 2006. As of June 30, this process is well under way with more than half of the Division laser AHDs in review in the electronic system. A temporary extension has been granted for AHDs that were to expire June 30, extending them until July 31.

As of this time, all of the existing laser AHDs have been reviewed during the evaluation year and it is believed that all aspects are current and accurate. Every laser system has been inspected at least once; some systems have been inspected several times. An additional inspection will be completed during the AHD reauthorization process scheduled to be completed by July 31.

Tracking of laser training compliance has been confounded by a number of factors. Defects were identified in the JHQ database programming that resulted in necessary laser training and eye exams not appearing on employees list of required training, or appearing as "recommended" only. The outdated MSD-only JHQ also contains errors that impact the identification of laser safety training. The new AHD system will greatly facilitate the tracking of laser safety training. The MSD JHQ is in the process of being retired.

Also, laser safety training on the UC Berkeley campus is tracked by the EH&S Office on campus. MSD has initiated a process with the Laser Safety Officer on campus to notify the Division Safety Coordinator periodically of incomplete training and laser eye exams for MSD personnel working with lasers on campus. The first implementation of this process in June 2006 identified 8 people who appeared to lack the required laser eye exams. The Division is working with these individuals and their principal investigators to arrange the needed eye exams.

“Rating” for this Expectation

Laser safety problems were identified earlier in the assessment year but interim and final corrections have been made and the laser safety program is operating safely. Based on the validation criteria for this expectation, the Division would merit a “green” rating.

Expectation 11

Requirement

Divisions control chemical, radiological, and bio hazards during lab moves and when PIs depart (change of accountability).

Assessment

Laboratory Moves

Extensive relocation of MSD laboratories into the Molecular Foundry was completed during the assessment year.

All or most of the Molecular Foundry “Jump Start” labs located in building 66 were moved into their final location in the Foundry. In addition, many non-Foundry activities associated with several Division principal investigators were moved into the Foundry. Finally, a large piece of scientific equipment donated by Agilent was packaged and transported from the South Bay to the Foundry.

This work was performed without EH&S accidents or incidents. The riggers from the Facilities Division were used to lift and move heavy equipment. Most of the other assorted equipment was moved by staff from the Transportation Department. Potentially contaminated equipment was assessed prior to moving it, and appropriate precautions were implemented.

All chemicals were packaged, transported and placed into their new storage locations by the EH&S Division personnel under the oversight of the MSD EH&S Technician. Prior to moving the chemicals, the following actions were taken:

- Container integrity was assessed—damaged containers were replaced or the chemical disposed of
- Labeling was assessed—Unlabeled or inadequately labeled containers were relabeled or disposed of
- Peroxidizable chemicals—All peroxidizable chemicals were tested prior to movement or disposed of as waste
- Chemical Inventory—All chemicals were bar coded and entered into the Chemical Management System prior to transportation to the Foundry.

The only incident associated with the chemical move occurred after the chemical had been placed in the Foundry, when a defective shelf in a flammable storage locker collapsed and splattered a student with solvent. This event was related to a construction defect in the new building and not to the chemical migration process.

No biohazardous or radioactive materials were moved as part of this effort.

Continuity of Chemical Ownership

Significant legacy chemical problems were discovered in some Division labs this assessment year. None of these were related to departing PIs, but some were related to departing students and post docs. In these labs, no process was in place to assure continuity of ownership of chemicals.

The most serious problem was the discovery of an abandoned refrigerator in the mezzanine area of building 62 filled with time and temperature chemicals. These materials had been placed in this hood prior to 2001 and forgotten. In the interim the compressor had failed and the refrigerator had come up to room temperature, several of the containers ruptured, the storage area had been corroded and many of the labels were obliterated. The owner of these chemicals had declared that they had been used up or properly disposed of in 2001. The services of a specialty hazardous materials contractor were necessary to identify, package and dispose of these materials.

Mid-Year Corrective Actions

Several corrective actions were implemented during the assessment year:

- Identified legacy chemical problems were cleaned up in several labs in building 66, disposing of hundreds of containers of unneeded chemicals
- All labs were inspected to identify legacy chemical problems
- Inspection for legacy chemicals was added to the routine laboratory surveillance provided by the new Division EH&S Technician
- Extensive discussion of the issue was included in the spring meeting of the Division Safety Committee.
- Implementation of the chemical tracking system has been enhanced (see expectation 8).

A new method of managing the chemical inventory has been instituted in the Molecular Foundry. All chemicals are placed in the names of one of the 6 lead scientists in the building. Staff scientists, technicians, post docs, students and guests are given access to this system as “proxies” for the lead scientist on an as-needed basis. This means of inventorying the chemicals offers several advantages, including the ease of tracking chemicals and updating the record in the infrequent event of the departure of a lead scientist.

In this approach, no chemical will ever be assigned to a transient person such as a student or guest. This should greatly reduce the likelihood of the accumulation of neglected,

forgotten legacy chemicals. If this system is effective as envisioned, it will be expanded to other MSD laboratory buildings.

“Rating” for this Expectation

Based on the validation criteria for this expectation, the Division would merit a “green” rating.

Expectation 12

Requirement

Divisions ensure that peroxide forming chemicals are effectively controlled.

The LBNL peroxidizable chemical management program includes the following key elements:

- Maintain an inventory of peroxidizable chemicals
- Label containers of peroxidizable chemicals with a special label
- Test (annually or quarterly) peroxidizable chemicals and record result on label
- Dispose of materials peroxidized > 100 ppm

Assessment

A preliminary assessment of the implementation of the LBNL peroxidizable chemical control program was conducted in October 2005. In general, it was found that the peroxidizable chemical management plan had not been implemented in the Division. Specific issues were:

- **Inventory**

The inventory of peroxidizable chemicals in MSD is derived from the Lab-wide “Chemical Management System (CMS)”. All hazardous chemicals are to be placed into the CMS system and the computer can then be used to sort out the subgroup of peroxidizable chemicals. As described under expectation 8, as of 10/05, utilization of the CMS system in MSD was about 50%. As a result, not all of the peroxidizable chemicals were identified in the peroxidizable chemical sort.

It was discovered that isopropyl alcohol is not included as a peroxidizable chemical in the LBNL chemical management software and thus was not included in this sort from the CMS system. Isopropyl alcohol is a very common solvent and is in fact peroxidizable, causing a number of lab explosions documented in the literature.

- **Labeling**

A specific label must be attached to containers of peroxidizable chemicals. This label allows the owner to note when the container was opened and the results of periodic testing for the accumulation of adventitious peroxides. In the October 2005 preliminary assessment, fewer than 5% of containers of peroxidizable solvents were properly labeled.

- Testing

All of the peroxidizable chemicals in MSD require annual testing. In 2005 the building manager for the building 62-66 complex stated that he had tested all of the containers throughout the Division. However, no record of the results was available and the bottles were not labeled with the results as required by Pub3000.

- Other Problems Through the Year

On two occasions, containers of peroxidizable solvents that had not been appropriately managed were tested and found to have concentrations of peroxides >100 ppm, the LBNL limit and the upper limit of the detection method. After dilution, these containers were retested and found to contain approximately 1000 ppm (0.1%) peroxide. These chemicals were immediately requisitioned for disposal by EH&S.

An abandoned refrigerator in the mezzanine area of B 62 was found to contain a number of bottles of old peroxidizable solvents, some of which were dated to the mid 1990's. Due to the potential for shock sensitivity these chemicals were removed during the night of May 22 by a hazardous materials contractor. The chemicals in this refrigerator were listed in the Chemical Management System, but had been tallied as "disposed of" in June 2001.

Mid-Year Corrective Actions

Due to the problems identified in the 10/05 review of peroxidizable chemical management, corrective actions were initiated:

- The MSD EH&S technician was trained on the implementation of the program.
- Three peroxide "test kits" were assembled which included colorimetric test strips, scintillation vials, droppers, labels, gloves and instructions.
- The MSD EH&S Technician met with safety representatives from the groups that possessed peroxidizable chemicals and described the requirements of the program and the use of the test kits. The technician was available to help with the testing process throughout the year.
- Old peroxidizable chemicals from the refrigerator in B 62 and other labs have been sent for disposal.
- EH&S has been notified about the failure of the CMS system to correctly identify isopropyl alcohol as a peroxidizable solvent. No compensatory action to test or label isopropyl alcohol has been taken in the interim, pending an evaluation by EH&S.

Follow Up Assessment

On 6/30/06, a follow up assessment labs possessing peroxidizable solvents was conducted. Most labs have fully implemented the program, although there were two PIs who had not completely implemented the program. These were corrected during this final assessment.

“Rating” for this Expectation

Based on the validation criteria for this expectation, the Division would merit a “green” rating.

Expectation 13

Work is performed within the ES&H conditions and requirements specified by Lab policies and procedures.

Assessment

The validation criteria for this expectation are based on performance in the four areas, each of which is “graded” on it’s own:

- Compliance with satellite accumulation area (SAA) rules
- Compliance with formal authorization documents
- Number of environmental violation from external agencies and large chemical releases
- Hazardous waste sample QA exception report
- Number of waste management notices of non-compliance

SAAs

SAA Compliance was formally evaluated by the EH&S waste liaison and the MSD EH&S Manager or Technician on 4 occasions:

- September, 2005
- December, 2005
- March, 2006
- June, 2006

In addition, the OCA conducted an inspection of the SAAS in May 2006.

The number of problem varied considerably, as shown in the table below. However, the “inspection of record” for this self-assessment is the Late May inspection conducted by OCA, with a compliance rate of 77%

Date of Inspection	% Compliant	Types of Problems
9/6/06	100	None
12/13/06	96	Waste past date for removal from SAA
3/17/06	68	Labeling errors, overdue waste, other problem
Late May	77	Labeling errors
6/6/06	87	Labeling errors

“Rating” for this Validation Criterion for the Expectation

Based on the inspection performed by OCA, waste management compliance was 77%, which would merit a “red” score for this validation criterion.

Authorization Compliance

See the discussion under expectation 6.

“Rating” for this Validation Criterion for the Expectation

A rating of “yellow” is appropriate for this validation criterion pending corrections planned for 2006-7.

Environmental Violations from External Agencies/Reportable Releases

The Division did not receive any notices of violation from any external agencies or chemical releases above reportable quantities. A spill of oil in the building 62 parking lot in August 2005 was not reportable.

“Rating” for this Validation Criterion for the Expectation

A rating of “green” is appropriate for this validation criterion.

Hazardous Waste: QA Exception Reports

The Division received two hazardous waste quality assurance exception reports, which reflect inadequate or erroneous characterization of hazardous waste.

- 7/22/05: pH listed as 13, actually 3.5-8.1
- 10/19/05: Legacy material, label said potassium dichromate, really NOCHROMIX in sulfuric acid

Overall, for the assessment year, waste characterization was 98% accurate.

“Rating” for this Validation Criterion for the Expectation

A rating of “green” is appropriate for this validation criterion based on a waste characterization accuracy of >95%.

Waste Management: Notices of Non-Compliance

MSD received no notices of waste non-compliance for this assessment year. It should be noted that the criteria for notices of waste non-compliance have been changed for next year. MSD would have received several non-compliance notices if the new rules were applicable in this assessment year.

“Rating” for this Validation Criterion for the Expectation

A rating of “green” is appropriate for this validation criterion based on receiving no notices of waste non-compliance.

Expectation 14

Staff is properly trained.

Assessment

This expectation is linked to two validation metrics:

- Percent completion of JHQs
- Percent completion of required EH&S Training

Completion of JHQs

At the close of the assessment year, 83% of MSD staff, students and guests had completed their JHQ. Completion was 90% for employees and 75% for guests.

20 of the 119 individuals missing JHQs commenced work at LBNL within 30 days of the end of the assessment year, within the “grace period”. Correcting for this, the JHQ completion rate is 86%.

Some individuals who have taken the JHQ clearly do not routinely work at LBNL. However, correction for this factor would be almost impossible.

The MSD specific JHQ system has not been maintained over the years, and thus results in incorrect identification of training classes in some cases. The MSD JHQ is being phased out as soon as the institutional JHQ can be modified to provide the needed MSD-specific functions.

<u>“Rating” for this Validation Criterion for the Expectation</u>
--

A rating of “green” is appropriate for this validation criterion based on a JHQ completion of 86%.

Completion of Training

At the close of the assessment year, the JHQ database indicated that MSD employees, students and guests had completed 85% of required EH&S training. The system reports a total of 352 incomplete classes and 1950 complete training classes.

The 85% result from the JHQ system does not account for recent hires who have not yet had a chance to complete the required training. 109 of the 352 incomplete classes fall into this category (30%). Also, it does not account for classes that were just introduced within the last 6 months, such as EHS062. Accounting for these factors, the training completion is 90%, which meets the criterion for a “green” rating.

Common missing classes, corrected for the factors listed above, are shown in the table below.

Class #	Class Title	Number Missing Training
EHS026	EH&S for Supervisors and PIs	31
EHS060	Ergonomics for Computer Users	8
EHS0231	Compressed gas and cryogen safety	24
EHS0260	Basic Electrical Hazards and Mitigations	28
EHS0289	Laser Safety Awareness	11

“Rating” for this Validation Criterion for the Expectation

A rating of “green” is appropriate for this validation criterion based on a training completion of 90%.

Planned Corrective Action

Even though the Division meets this expectation, there are still quite a number of employees who have not completed required training. MSD has worked with EH&S to develop a new web site that will greatly enhance web based training and make it easier for staff, students and guests to complete there required EH&S training. This web site, put into operation June 9, 2006, allows guests who have not yet obtained an LDAP password to complete and get credit for training. Additional classes will be added to this web site shortly.

Expectation 15

Division ensures that student safety issues are effectively addressed.

Assessment

MSD had a very high flux of graduate students. As of August 2005 there were approximately 220 graduate students of various types working in the Division.

As with all MSD personnel, students are expected to be fully trained for the work they perform. Per the ISM plan, this is the responsibility of the supervisor (MSD PI). MSD students fill out a JHQ and take required training courses. MSD makes no distinction between students, guests, and staff in investigating accidents and determining root causes.

During the assessment year, students were directly involved in 2 accidents:

- Chemical splash in building 67–Due to hardware failure in the Foundry, no injury was experienced
- Head injury in building 2–Due to student error

Interviews were conducted on several occasions with graduate students. It was determined that in general, the level of training of students in specific technical areas, such as chemical safety, was satisfactory, but the level of training in administrative controls such as AHDs and the chemical inventory was inadequate.

A new version of MSD010, the MSD-specific “Introduction to EH&S” class was developed and placed on the MSD internal web site. Similarly, a new class TMF010 “Integrating Safety into Science at the Molecular Foundry” was prepared and placed on the institutional safety training web site. Students make the most use of these introductory classes.

Several meetings were conducted with groups of students working with a particular Principal Investigator. This approach of improving communication with students was very successful and will be expanded in the coming year.

“Rating” for this Validation Criterion for the Expectation
A rating of “green” is appropriate for this validation criterion.

Expectation 16

ES&H deficiencies identified from workspace inspections, self-assessment activities, SAARs, Occurrence Reports, environmental inspections, and external appraisals are corrected in a timely manner.

Assessment

When queried at the end of the assessment year, the Corrective Action Tracking System (CATS) system (which was initiated as a replacement for the LCATS system in 2005), listed a total of 226 EH&S entries for MSD in 2005-6. At one point this number had been larger, due to the inclusion of campus-based findings, but most of the campus-based findings have been removed and are tracked separately by campus EH&S.

At the close of the self assessment year, there were 24 outstanding line items in the database. Of these, only 19 are “overdue”, past the expected completion date. 8 of these belonged to one PI, who had reported the completion on 6/28/06 but these completions were not entered into CATS until July. These updates were made to the CATS system in July 2006, but as noted, reflect work completed in June, within the assessment year,

Thus, a net of 11 items were actually outstanding at the close of the year. Two still-incomplete items were categorized as a “medium” priority; all of the others are “low” priority.

A large number of inspection findings from campus-based MSD labs were submitted to the University of California at Berkeley office of EH&S for tracking and correction. The most important of these, the medium priority items, have been completed by campus EH&S.

The legacy "Laboratory Corrective Action Tracking System" (LCATS) contained a total of 24 items from this assessment year. As of the close of the year, 13 of these were listed as "Open". However, all but 3 of these had been reported as closed on June 19 by Diana Phillips. The database was updated in July 2006, but this reflects work completed during the 2005-6 assessment year. Thus, there were really only 3 incomplete corrective actions for the assessment year left in this database.

MSD had one corrective action assigned as part of an ORPS report (the Latimer Hall Fire). This action was to develop and submit a "lessons learned" describing the need to assess hot plate switch function. This action was completed within the assigned time frame.

One SAAR was the result of a failure of a flammable storage cabinet in the Molecular Foundry. A corrective action from this was to make engineering changes to the built-in flammable storage lockers in the Foundry. This was completed promptly.

The Office of Contract Assurance reported that MSD closed 90% of CATS/LCATS findings in a timely manner for this assessment year.

"Rating" for this Expectation

A rating of "green" is appropriate for this validation criterion based 90% correction rate reported by the OCA.

Corrective Actions

With the hiring of new and additional staff (administrative assistant dedicated 50% time to the Facilities and EH&S program, the new full time Division EH&S Technician, the new building manager for 62/66/67) tracking of EH&S findings will be much more frequent.

- The administrative assistant will query the CATS system weekly and responsible individuals will be e-mailed when the due date of a finding approaches.
- If no action is forthcoming from the responsible individual, the EH&S Technician or Building Manager will be assigned to make corrections where possible, charging the responsible individuals project identification number.
- Reports of individuals who exceed the assigned correction times will be provided to the deputy Division Director weekly.

The supervisors responsibility to ensure timely EH&S corrections is addressed in some detail in EHS026, EH&S for Supervisors and Principal Investigators. This class was only

recently rolled out in MSD, and half of the supervisors/PIs have not yet completed this training.

Expectation 17

ES&H programmatic deficiencies identified from Management of ES&H (MESH) Reviews, Integrated Functional Appraisals (IFAs), and previous Division Self-Assessments are corrected in a timely manner.

Assessment

No outstanding programmatic commitments or deficiencies were identified from the prior Management of EH&S review (2003) or the prior Integrated Functional Appraisal (2003). Similarly, there were no formal findings by the DOE or outside regulatory agencies resulting from formal inspections. Informal inspections by DOE did result in findings related to laser safety and the laser inventory, these are discussed in the section pertaining to laser safety.

The following commitments for the 2005-6 assessment year were identified in 2004-5 self assessment report.

Commitment: Use the LCATS system to remind owners of the need to annually test peroxidizable chemicals

Outcome: It was decided not to use CATS for this function, but instead to make review of peroxidizable testing a routine part of the new MSD EH&S Technicians job. The tech will review the performance in this area during his routine lab inspections and when chemicals are coming due for retesting he will notify the owners. This has already been implemented for the 2005-6 assessment year, and will be repeated during the coming year.

Commitment: the MSD EHS Administrator will enter an LCATS record every 6 months requiring that SAA custodians request a pick up of all the waste in their SAAs.

Outcome: It was decided not to use CATS for this function, but instead to make review of waste disposal a routine part of the new MSD EH&S Technicians job. The tech will review the performance in this area during his routine lab inspections and when chemicals are coming due for disposal he will notify the owners. This has already been implemented for the 2005-6 assessment year, and will be repeated during the coming year. Inspections are also conducted quarterly by the EH&S Waste Liaison and the MSD EH&S Technician.

Commitment: Reduce ergo injury rate (2 recordable cases).

Outcome: There were no ergonomics injuries this assessment year.

Commitment: Increase training rates for Hill employees/guests throughout the year

Outcome: As discussed in Self Assessment reports from prior years, the high turnover of MSD personnel creates challenges in maintaining an acceptable level of training compliance. The EH&S training database was used extensively to increase JHQ and training compliance. Periodic reminders and reports to PIs, safety coordinators, and program administrators have been helpful. Automatically generated reminders are not sufficient by themselves, however. Personal follow-ups with supervisors and employees increase participation in safety programs and training, and are an important part of MSD safety administration. Overall, the rate of completion of JHQs and training is essentially unchanged since last year.

Commitment: Continue emphasis in waste management with the goal of zero NCARs and an SAA compliance rate of 100%. Continue to explore use of web and/or video based training and retraining to maintain worker awareness in this area.

Outcome: NCARs were eliminated, but compliance with waste management was highly variable. The Division continues to struggle with waste management issues.

“Rating” for this Expectation

A rating of “green” is appropriate for this validation, as all of the issues identified in the prior years Self Assessment are being addressed, albeit not exactly as anticipated in 2004-5.

Expectation 18

Requirement

Division employees report injuries and near miss events and the Division performs thorough review of all staff injuries, accidents, and near-miss events including analysis of conditions that led to injury. Corrective actions to prevent recurrence are identified and effectively implemented.

Assessment

There were 3 injuries/illnesses within MSD during the assessment year:

- Employee cut by glassware requiring stitches
- Employee made ill by smell from adhesive used for asbestos abatement
- Student injured head on experimental equipment requiring stitches

There were a larger number of incidents/near misses that did not result in injuries:

- Two small fires within the Molecular Foundry
- Employee spilled solvent on himself when shelf failed
- An oil spill in the building 62 parking lot.
- Fire in a fume hood in Latimer Hall
- Desk collapsed when employee stood on it

- Two employees reported the beginning of pain related to computer use
- Scissors disposed of in the routine trash almost cut a janitor
- Rupture of a alcohol/nitric acid mixture in storage

Each of the injuries and incidents was investigated.

- Injury investigations were documented using the SAAR system where applicable. Appropriate corrective actions were identified in the SAAR as needed.
- Lessons learned were issued by LBNL for the Latimer Hall fire, the shelf collapse and resulting chemical exposure in the Molecular Foundry, and one of the Foundry Fires Each represented important lessons where routine assumptions about the integrity of equipment lead to significant incidents with the potential for much more serious consequences. . A Lessons Learned is in development for the solvent/acid container rupture.
- An edition of Materials Safety was issued in response to the improper disposal of scissors in the trash in the National Center for Electron Microscopy.
- Interventions were made for the two incipient ergonomics cases that prevented further problems.
- EH&S has not yet been able to identify a replacement for the malodorous product that is used following asbestos abatement that caused the illness of one MSD employee and irritated numerous others.

The reporting of accidents, illnesses and near misses are stressed as part of the MSD-specific EH&S Training for Supervisors and principal investigators. It is also addressed in the revision to MSD 010, Introduction to EH&S in the Materials Sciences Division, and in TMF010, Integrating Safety into Science at the Molecular Foundry.

“Rating” for this Expectation

A rating of “green” is appropriate for this expectation.